The Veterinary Record

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 47. NOVEMBER 22. 1941. VOL. 53.

"WAR GASES" AND FOODSTUFFS

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(Continued from page 668)

Contaminated Foodstuffs and their Salvage

As a general rule foodstuffs contaminated by "war gases" can be detected by their smell and decontamination is said to be accomplished when the characteristic smell is no longer recognisable. This is not an infallible rule, however, as mustard gas and the arsenical "gases" can give rise to untoward symptoms when they are present in foodstuffs at concentrations below that detectable by smell while other gases, such as the lung irritant and tear "gases," give rise to disagreeable smells at concentrations well below toxic limits. It is advisable in cases of doubt, particularly when arsenic is suspected, not to release decontaminated foodstuffs until an analyst's report has been obtained.

Foodstuffs affected with Lung Irritant "Gases" and their decontamination

Although these "gases" do not affect foodstuffs dangerously, they usually give rise to disagreeable odours and tastes and, therefore, affected supplies must be decontaminated. As these are non-persistent "gases" decontamination can usually be achieved by aeration for 24 to 48 hours until the taste of the "gas" has been removed. Corn, barley, oats, flour and similar comparatively dry materials affected with chlorine, phosgene, diphosgene or chloropicrin can be rendered fit for consumption by intensive aeration, particularly if the foodstuffs be shaken and tossed about.

Bread affected by chlorine can be decontaminated by rebaking. Chlorine can be removed from raw meat by boiling, by cutting off the surface layer or by washing with a dilute soda solution: washing with soda, however, extracts nutrient material and increases perishability. The flavour of cheese exposed to large quantities of chlorine is markedly altered and the fat is often oxidised, in which case aeration does not make the cheese fit for consumption. Chlorine does not affect cheese wrapped in foil. It is not possible to remove the taste completely from chlorine-contaminated milk by aeration or filtration.

Flour contaminated with phosgene or diphosgene may become sour and slightly unpalatable and it is likely to make a poor loaf, but these drawbacks can be removed by aeration and subsequent admixture with unaffected flour. The outer layers of bread may become unpalatable, a defect which can be removed by re-baking or cutting away the outer portions and aerating. Cereals are very little affected by phosgene. Contaminated meat and fish may have slightly discoloured surfaces and cheese, butter, margarine and fats may be superficially bleached. Fresh fruit is practically unaffected but dried fruits will usually have a tainted taste. Efficient aeration will correct most of these defects except the change in appearance, but meat products, fats and cheese will need prolonged aeration to effect complete decontamination. The taste of tea or coffee may be rendered bitter by contamination with phosgene or diphosgene, and although aeration will effect considerable improvement this should be followed by admixture of the tainted material with about ten times its volume of uncontaminated material. Phosgene and diphosgene both liberate hydrochloric acid quickly on contact with water or foodstuffs with a high water content. Usually thorough airing, particularly with a dry, warm current of air, will make the food fit for consumption, but if large quantities of these "gases" are absorbed by green foods such as cabbages, lettuces, forage plants, grass, etc., these materials lose their green colour, the shoots and outer parts become brown or withered and the plant becomes limp. Such plants have lost much of their food value and do not repay decontamination. Eggs are not affected by these gases, but a taint is usually imparted to milk.

The removal of chloropicrin from contaminated foodstuffs which contain little water can be readily accomplished by intensive aeration. It is not so easy to decontaminate foodstuffs containing a large proportion of water and usually such foods retain an unpleasant taste and have an irritative effect upon the mucous membranes and so cannot be considered fit for human consumption.

Foodstuffs affected with Tear "Gases" and their decontamination

Materials contaminated with the non-persistent tear "gases" can usually be rendered fit for human consumption by adequate aeration. Exposure of the majority of foodstuffs to high concentrations of the persistent tear "gases" for several hours renders them uneatable, mainly as the result of the imparted, very bitter, taste. Unfortunately, it is difficult to remove this taste by aeration and in bad instances the contaminated food may have to be rejected for human consumption although it can generally be consumed safely by animals. On the other hand, aeration is

satisfactory for the decontamination of foodstuffs slightly affected with these persistent tear " gases." Liquid beverages, such as beer and milk, affected with persistent tear " gases " are usually rendered so unpalatable that they have to be destroyed.

Foodstuffs affected with Nose Irritant " Gases " and their decontamination

These arsenical smokes are not so readily absorbed as most other " gases " by foodstuffs and as they are non-persistent contaminated materials can be made wholesome fairly readily by aeration. As, however, these " gases " contain arsenic, aerated foodstuffs should not be released for human consumption until they have been examined by an analyst and pronounced safe.

Foodstuffs affected with Mustard Gas and their decontamination

Mustard gas, besides being the most effective " war gas " to use against human personnel, is also the " gas " likely to cause the greatest danger arising from the contamination of foodstuffs. It is highly persistent, stable, has great powers of penetration, is soluble in oils and fats and therefore readily penetrates into the skin of human beings and animals, it is effective either as a liquid or vapour, and its presence is not easy to detect by smell or immediate physiological effects. These are qualities which make it particularly serviceable as a foodstuff-contaminating agent.

Liquid mustard gas obstinately adheres to all objects, including foodstuffs, owing to its permeating action, its low volatility and its slow rate of hydrolysis ; hence in dry cool weather affected foods may remain dangerous for many weeks. Foodstuffs slightly or heavily contaminated with mustard gas, whenever practicable, should not be released for consumption after decontamination until an analyst's report has been obtained. If this is not possible, the decontaminated material should be mixed with wholesome foodstuff, or appropriately cooked.

Slight contamination by Mustard Gas Vapour.—Foodstuffs contaminated by exposure to mustard gas vapour should be aerated as promptly as possible. Non-fatty foods, such as bread, cereals, rice, vegetables, white fish, dried fruits, tea, coffee, sugar, etc., are not affected very seriously, and prompt aeration will usually convert affected foodstuffs, except those of a fatty nature, into an edible condition. Fatty foodstuffs, *e.g.*, butter, margarine, cream, cheese, cooking fats, bacon, fatty meats and fatty fish, absorb the " gas " more readily, but usually it is concentrated in the surface layers and hence the removal of the superficial layer usually effects the decontamination, particularly if this is followed by a cooking process. Penetration of the " gas " does not usually exceed 2 cm. even after 24 hours' exposure to relatively high concentrations of vapour. Occasionally there is a slight loss of palatability with the non-fatty foodstuffs and a more marked unpalatability with the fatty materials.

Foodstuffs such as hay, straw and harvested corn which are slightly contaminated with mustard gas should be spread out on the ground in thin layers and exposed to sun and air with frequent turnings. The temperature should, when possible, be not below 68° F. The progress of decontamination is followed by testing the smell, but as a concentration of " gas " less than that required to give a perceptible smell sometimes causes ill-health, the decontaminating process should be allowed to go on for a time after the smell has disappeared. Furthermore, the decontaminated foodstuff should, wherever possible, be blended with wholesome products.

Cereals, such as oats, barley, maize and legumina, slightly contaminated with mustard gas can be decontaminated by cooking in small quantities for at least one hour. The cooking water should be poured off and decontaminated with chloride of lime. Large quantities of corn slightly contaminated can be decontaminated by aeration. Various kinds of bran and flour which are slightly contaminated with mustard gas may be used after removal of the upper layer and subsequent cooking of the remainder for at least one hour. (N.B.—The steam is poisonous.) The absorption of mustard gas by bran, flour, etc., leads to the formation of lumps on the surface and the penetration of the gas into the bulk of foodstuffs does not take place to any great extent. Provisions with a high water content such as green foodstuffs, root crops, etc., are not easy to decontaminate, but this can be achieved if the contamination is recent. In the case of lean meat, aeration should be coupled with removal of the surface layer. Slight vapour contamination of meat can be removed by smoking at a temperature of 167° F. for 3–4 hours.

Spray or Splash contamination.—Relatively light contamination of exposed foodstuffs by very small drops of mustard gas does not necessarily involve the condemnation of the foodstuff. Where practicable, the surface should first be washed in a stream of water, *e.g.*, with potatoes, oranges, etc., and the washing should be followed by aeration. Sometimes it will be advisable to cut away contaminated surfaces to a depth of ½ inch and aerate the remainder.

Owing to its fatty content, milk is able to retain a considerable quantity of mustard gas in a dissolved and undecomposed state. Such milk is unfit for consumption. If the machinery is available prolonged drying under reduced pressure but increased temperature can effect some salvage.

Other liquids, such as beer, cream, drinking water, etc., if contaminated by droplets of the " gas," should be condemned.

Eggs contaminated by liquid mustard gas may be decontaminated by applying a paste of aqueous chloride of lime to the shell, and washing off soon afterwards. The taste is not affected by this process provided the washing is effected without delay and rapidly. Foodstuffs contaminated really severely with mustard gas liquid will generally have to be condemned.

Mustard gas, even as droplets, does not penetrate into meat to any considerable extent provided the surface is unbroken ; even after 48 hours it will have penetrated to no greater depth than 4–5 mm. Only about 30 per cent. of the gas actually penetrates into the meat and the remainder can be readily removed by washing. Usually the liquid remaining on the surface becomes less clear as the result of the infiltration of fat into it. In time the " gas " is decomposed and the resulting hydrochloric acid will gradually form with the proteins a thin protective film, which will hinder the further penetration of the " gas." Mustard gas will penetrate the rind of bacon

to a depth of 5 mm. in 1–3 days, but the penetration will occur more quickly when the bacon is of looser tissue. The skin of dried sausages, such as salami and the salted, durring surface of salted meats impedes the passage of mustard gas and prevents its deep penetration. The artificial cellophane skins of sausages are more resistant to the passage of the " gas " than are the natural skins. Exposed meat products containing little water but a high proportion of fat, especially if their proteins have been denatured by previous treatment, are more liable to serious damage by mustard gas than are the raw products.

Meat products which are slightly contaminated with mustard gas can be made fit for human consumption by washing off the adhering drops of " gas " with water, using a brush or a piece of rag for this purpose. Meat well splashed with the " gas " should have the top surface layer removed to a depth of about 1 cm., care being taken during the removal of the layer not to spread the contamination to the newly exposed, uncontaminated surface. In cases of severe contamination the advisability of attempting salvage will have to be seriously considered. Badly affected meat can be decontaminated by boiling with water, preferably with the addition of salt. As soon as the water boils it should be removed and replaced by fresh water, this process being repeated once or twice. Roasting or frying does not effect this decontamination as the mustard gas is not decomposed thereby to non-toxic products, as oxidation of the thiodiglycol occurs giving rise to sulphone and oxides of sulphur.

Heavy droplet contamination of foodstuffs by mustard gas is always difficult to deal with, but such foodstuffs should not necessarily be condemned. When possible heavy surface contamination should be guarded against by the use of tins; any leakage of " gas " into the foodstuffs may then be dealt with by aeration. Prompt action in removing the outer layer of heavily contaminated foodstuffs, when this is feasible, will save the bulk. Splashed food-containers of solid metal can be safely treated with a watery suspension of bleach followed by washing with water; wooden barrels can be similarly treated but greater care is necessary in case the " gas " has been absorbed into the wood. If there is any suggestion of this the liquid contents should be immediately removed to other containers. Contaminated wooden and cardboard boxes may be treated with bleach suspension in order to reduce the risk during handling, but the important thing is to remove the boxes as quickly as possible to the decontamination centre, take off the casing and subject the foodstuffs to aeration. Contaminated sacks, hessian bales and crates should be similarly treated. All contaminated coverings should be destroyed after removal of the food material.

Foodstuffs affected with Lewisite and their decontamination

Foodstuffs contaminated with lewisite are treated in ways similar to those affected with mustard gas, but they should never be released even after treatment without an analyst's report certifying that the danger of arsenic poisoning is absent. Although watery foodstuffs readily decompose lewisite the toxicity remains, as the arsenic is not actually removed by this treatment.

Contaminated " Meat on the hoof "

Cattle, sheep, goats, pigs, poultry, etc., are susceptible to " gas " attack whether they be housed in towns or at large on the farm, but the likelihood of their becoming contaminated is greater in towns.

The effects of " war gases " upon animals are in general similar to those upon man save for the facts that the tear gases and arsenical smokes are without serious effect upon animals in concentrations likely to be met with in actual practice. Birds are generally highly susceptible to " war gases." Should food animals become contaminated the question of their treatment and return to productivity or of their slaughter and the salvage of the carcases for human consumption needs careful consideration. The proper person to advise upon such matters is the veterinary surgeon. Treatment is usually indicated when inflammation of the eyes, marked coughing and nasal discharge, are the only symptoms evident, but if these are accompanied by loss of appetite, rise of temperature, disturbance of rumination and a falling off of condition early slaughter might be indicated as an essential economy. Treatment, however, may be permissible. If serious digestive disturbance is present, particularly if this is coupled with ulcerative lesions of the mouth, excessive salivation, diarrhoea, etc., slaughter is advisable. No attempt should be made to salvage the carcases of animals which have died from the effects of " poison gas."

Animals badly affected with lung irritant or blister gas vapour should be slaughtered at once, the offals rejected and the flesh retained for human consumption unless there are signs of congestion or a fevered condition. The danger from the contamination of animals with liquid mustard gas will persist as the liquid will stay in the coats of animals for comparatively long periods, owing to the presence of natural oils or fats. Generally the " gas " penetrates a short distance below the skin, *e.g.*, about 4 mm., in 24 hours or so, but skin lesions (*e.g.*, oedema) will not usually become apparent for 48 hours. When possible, early decontamination of affected coat and skin should be carried out. This is often more easily effected while the animal is alive. As the flesh of animals killed after having been affected by liquid mustard gas is not objectionable, provided the decontaminated skin is carefully removed and the flesh underneath the affected areas is cut away, animals heavily contaminated should be decontaminated by scrubbing with bleach cream, washing off immediately, and then slaughtering and bleeding as quickly as possible. After skinning, a layer of the flesh directly beneath the affected areas should be cut away and the offals discarded; the remainder of the meat will be safe. In the case of animals showing severe symptoms, such as ulceration of the mouth, dribbling saliva and diarrhoea, quick slaughter and evisceration of the carcase, followed by proper dressing and the cutting away freely of any affected parts will remove all danger from eating the flesh. The offals should be rejected. The carcase of animals which have died from mustard gas burns, however, should not be salvaged for human consumption.

Animals badly contaminated superficially by arsenical gas should be slaughtered immediately, the hide decontaminated and any discoloured flesh beneath rapidly removed. The rest of the carcase may be passed for human food, provided the analyst

consents. The carcases from animals which become ill from arsenical poisoning following upon the consumption of badly contaminated fodder must be rejected.

Contaminated Water Supplies

Dangerous contamination of the large supplies of water held in reservoirs is practically impossible owing to the high concentration of "gas" which would be necessary to reach a toxic limit. Small supplies in tanks, storage vessels, etc., are liable to contamination, however, and should be covered as far as possible. Poisoning of subsoil water is unlikely.

In the case of rivers and streams, the natural rate of dilution is so fast that prolonged danger need not be anticipated. When small superficial water veins which run underneath rubble or gravel and feed a well chamber are struck by a shell they may contain poison gas for a longer period, but it may be presumed that the content of the "gas" will soon fall below the limit of toxicity as a result of the natural processes of dilution. Hence drinking from running water is attended by little danger. The main danger from poisoning through drinking contaminated water is when the main supply has been interfered with and the population has to fall back upon small reservoirs or unusual supplies.

Chlorine is readily soluble in water and easily detected by its disagreeable taste and smell. Excess chlorine in water may be removed by exposure to air and filtration through absorptive charcoal. Water quickly decomposes phosgene and diphosgene, forming hydrochloric and carbonic acids, and hence there is practically no danger of poisoning. Chloropicrin is not decomposed by water, but owing to the great irritation it causes to the eyes and mucous membranes, human beings and animals refuse to drink the water. Similarly, the irritant effects of other gases, such as the lachrymators, warn man or animal.

If mustard gas comes into contact with water, the greater part of it is deposited, a little dissolves (approximately 1 gm. per litre of water) and a trace frequently remains on the surface in the form of a film. Hydrolysis commences immediately but is a slow process, although ultimately it gives rise to non-toxic products, the time taken to bring this about depending upon such factors as the amount of movement in the water and its temperature.

If water tastes or smells peculiarly, or if there is any other reason for suspecting contamination by "war gases," the matter should be immediately reported to the A.R.P. authorities. Suspicion may be aroused by unpleasant, although usually transitory, irritation of the sensitive parts of the skin and of the eyes during the use of contaminated water for washing, bathing or laundering. In many cases valuable clues may be obtained as to the nature of the "gas" contained in the water by boiling and cautiously examining the smell of the escaping vapours and their irritative effect upon mucous membranes.

If the use of stagnant water cannot be avoided the water must be drawn carefully from the surface in order to diminish the danger of poisoning by blister and persistent gases delivered in a liquid or solid form. Animals must not be allowed to enter contaminated water because they would stir up the bottom layer, together with the particles of gas which might be lying on it, and thereby increase the danger from ingestion of the water. If the water which has been drawn without undue stirring from contaminated ditches or ponds contains neither drops of mustard gas nor traces of film after having been left to stand for one hour, two-thirds of the contents of the receptacle may be poured off and then used for washing, or if necessary for watering animals. The remaining third at the bottom of the receptacle must be thrown away. If it is suspected that the poured-off water still contains small quantities of mustard gas, as indicated by globules on the bottom or a surface film, it must be boiled in the open air or at least in a place where there is an unimpeded outlet for the poisonous steam, or it may be filtered through activated charcoal and left to stand for an hour.

Water which is not to be used for drinking may be decontaminated by chemical means, using either hypochlorous acid or chloramine: despite a slight smell of garlic, the water so treated is no longer harmful.

Since when war gases have been used it is always possible that water may be contaminated with arsenical gas in addition to mustard gas, the water should not be drunk in large quantities even after it has been boiled, until it has been analysed or given experimentally in small quantities. The latter method may have to be used sometimes as in the field it is rarely possible to determine the degree of the arsenic contamination. Water contaminated with lewisite may not be used for either washing or drinking.

Powdered calcium arsenide may be used to contaminate water. If contamination did occur the calcium arsenide would be rapidly decomposed into calcium hydroxide and arseniuretted hydrogen. The latter is to some extent soluble in water so that under favourable conditions some of it might remain in solution. If calcium arsenide were used in this way it would probably be in an impure state and contain arsenite and/or arsenate, which would then be found dissolved in the water. Where such contamination has occurred or is suspected, it will be necessary to determine by analysis if arsenic is present in undesirable quantities.

If such analysis showed that arsenic was present beyond permissible limits, its removal in case of dire need could be carried out by treatment with bleaching powder followed by ferric alum and alkali in accordance with the standard method used for treatment of water poisoned with arsenical compounds.

Contaminated Crops

Serious harm on a large scale is not likely to arise from the gas-contamination of crops but comparatively small areas may become affected from chance attack.

Crops affected by "gas" liberated from a bomb will usually show discoloration in the immediate vicinity of the bomb-burst. Lung irritant gases would bleach green vegetables; other gases in high concentrations would scorch the plants and the crop would usually be destroyed, except grass and trees which would ultimately recover. Crops affected by spray will usually recover, fairly quickly in the case of non-persistent and more slowly with persistent gases. Drops of liquid mustard gas give rise to brown spots on green plants.

Crops affected by non-arsenical "gases" can usually

be left to the weather, which will effect their decontamination often within a week and nearly always within a fortnight. The greatest harm naturally results when the crop becomes contaminated at harvest time as then reaping must be delayed and the crops become seriously over-ripe. Sugar beet crops affected at the seedling stage will be gravely affected and must be ploughed in.

The bulk of crops contaminated with lewisite will die as a general rule and should therefore be burned or ploughed in. Crops and land affected by arsenicals will require about six weeks before decontamination results from weathering.

A contaminated area should not be declared safe until it has been shown to be free from toxic concentrations of "gas" by the skin test (for mustard gas), by a careful animal feeding test or by direct analysis, a sample of the crops being used for this purpose.

Fruit contaminated on the tree or bush can be left to weather if it is affected during the earlier period of growth, although it is advisable to have it examined by an expert for arsenic when ripe: if the contamination occurs during ripening the fruit will have to be rejected unless it is a hard fruit, when it may be picked and rapidly decontaminated by washing or other suitable method.

The Contaminated-Food Service

Responsibility for Action

Complete protection against "gas" is very difficult to achieve, especially with coarse, bulky foodstuffs, owing to the space they occupy and the large surface which they present. The provision of suitable coverings, such as tarpaulins, is attended by great expense and difficulties and hence, in warfare where "gas" is being used, particularly as it will generally be accompanied by high explosive attack, it is to be expected that large quantities of all kinds of provisions will become contaminated.

The responsibility for dealing with foodstuffs contaminated by "war gases" does not belong to the owner but is imposed upon local authorities, under Regulation 25 (2) of the Defence Regulations, 1939 (Statutory Rules & Orders, No. 927). Local authorities are granted powers to seize, hold and condemn, such contaminated food; they must examine it and decide whether it must be destroyed or can be satisfactorily salvaged and subsequently released for human consumption, for consumption by animals or for manufacturing purposes.

The Personnel

A skilled personnel is required for the handling of gas-contaminated foodstuffs and no untrained storekeeper or member of the public should touch such foodstuffs. The presence of contaminated supplies should be reported immediately to the local authority and no further action taken except to prevent persons entering or supplies leaving the contaminated store. Even when the arrival of the trained personnel is long delayed no further steps should be taken, for there is a grave risk of serious personal injury if salvage is attempted by unprotected and inexperienced individuals.

In order to comply with its obligations the local authority delegates its powers to a "Gas Contamination Officer," who is made responsible for the development of the contaminated-food service and the carrying out of its duties. This officer is usually the Chief Food Inspector and may be a medical or veterinary officer or the Chief Sanitary Inspector. He is assisted by one or more trained food treatment squads, recruited so far as possible from individuals with experience in the handling of foodstuffs. It is preferable to organise the squads on a trade basis and the personnel should include one or two butchers, but over-specialisation must be avoided. Food treatment squads can be recognised by their yellow helmets. They should be properly equipped for dealing with gas-contaminated objects, but in view of the fact that the service will generally operate only after the general danger from "gas" has been largely dissipated, much of the work can, if necessary, be accomplished by individuals wearing protective head clothing, a long, loose, absorbent smock, Wellington boots and gloves. If gloves are not available the operator's hands can be protected by freely smearing them and the lower forearms with anti-gas ointment No. 2.

Preliminary Organisation

Arrangements must be made in case of need for the co-operation of medical, veterinary and analytical services as well as the police and civil defence services, and therefore, the local officers of these services should be approached by the Gas Contamination Officer with this end in view. The conditions necessary for full co-operation with the food-decontamination services of adjoining localities must also be established at an early stage.

Vehicles suitable for the transport of contaminated foodstuff must be earmarked and drivers enrolled in the service. The best vehicles to secure are those with metal lining but failing these, where possible, contaminated foodstuffs should be kept out of actual contact with the woodwork of the vehicle by the use of impermeable coverings. The modern van used for the collection of refuse is eminently serviceable for this purpose. Vehicles must be decontaminated after use.

Gas contamination officers should make a survey of all food storage depots, food factories, cattle, sheep, pig, horse and poultry centres, markets and railway sidings in their district, noting the nature and quantity of food material or animals likely to be there and the days when markets, etc., are being held.

A food decontamination centre should be established and other possible centres reviewed in case centres have to be improvised during an emergency. The centre which it is decided to equip fully should be comparable with the foodstores present in the locality and should be sufficiently large to deal with any likely contingency.

The Decontamination Centre

The Site.—In choosing a site for a decontamination centre two important facts must be borne in mind; firstly, the necessity of having the centre reasonably well separated from human habitation and, secondly, the need for plenty of floor space, if the methods of decontamination are to have reasonable chance of success. The site should also have facilities for a good supply of water and for good drainage, and there should be reasonable approach to it. Parks, commons, playing fields, disused abattoirs or markets, waste

land or cleared bombed sites might afford the desired facilities.

The Buildings.—The choice of building will depend in large measure upon the necessity to keep down costs and, therefore, the avoidance of new building projects or large-scale adaptation, whenever possible. Suitable buildings which are fairly common and which are usually situated in open spaces, are sports pavilions, disused abattoirs, dutch barns and garages. Marquees with the sides rolled up and partially demolished institutional or factory buildings are sometimes suitable. Whatever building is chosen it should afford proper facilities for the practice of all methods of decontamination and yet at the same time it should be so constructed that it does not itself unnecessarily retain "gas." Where possible it should comprise four main sections, preferably separated from each other by a reasonable gangway of air. The first section should be a place for the reception of contaminated foodstuff, the second for the removal of gross contamination, the third for aeration and the fourth for the temporary storage of decontaminated foodstuff. Whether the different sections are separated from each other or not, every precaution should be taken to avoid secondary contamination and the transfer of "gas" from one section to another. Trays of bleach suspension should be placed at the entrance of each section and whenever a contaminated section is empty it should be decontaminated.

It is advisable when possible to divide the personnel at the decontamination centre into two groups, one handling contaminated foodstuff and the other only handling that which has been decontaminated. The two groups should not mix. In actual practice, however, it will sometimes prove impossible to have these two groups of workers and then every care must be taken to ensure that a worker who has been engaged in active decontamination does not handle the salvaged products until he has thoroughly cleaned himself and removed all traces of "gas." A fifth section is, therefore, advisable for the decontamination of personnel. The practicability of this intermediate cleansing is facilitated by the fact that a foodstuff rarely becomes decontaminated until it has been subjected to many hours' aeration.

The reception section of the decontamination centre should wherever possible have a roof, but it may simply be an adjacent area of land roped off for the purpose, the food in that case being protected from the weather by tarpaulins or other screening material. If a building is to be used it should preferably be composed of materials amenable to decontamination.

The section for removing gross contamination must have facilities for thorough washing, for dipping in bleach cream, and for the removal of contaminated surface layers from various consolidated foodstuffs. It should also have space for the quick removal of splashed packing cases from foodstuffs, and a suitable destructor for these casings and other condemned materials should be at hand. There must be a good water supply and adequate drainage with hosing facilities for gentle washing. Brushes, swabs, etc., should be available. Concrete is a satisfactory material to use for the flooring, which must be of readily washable material and relatively non-absorbent of gas. Overhead protection from the weather is advisable although not essential to this section. The removal of contaminated surface layers is facilitated if there are available benches or tables with tops which can be readily decontaminated. They should be metal- or enamel-surfaced or made of hard wood. Suspension equipment, knives, apparatus for the rapid decontamination of knives, etc., should be at hand. Baths of reasonable size are advisable for dipping contaminated food containers in bleach cream and where possible the baths should be raised to a suitable working height. This process is best carried out by the use of wire baskets or crates so that a number of containers can be dipped simultaneously, lifted out and washed thoroughly with water. A suitable store of bleaching powder should be included in this section of the centre.

The space devoted to the aeration section should not be unnecessarily restricted, for the whole success of decontamination will depend upon the extent of the food surface which can be exposed to the air. Furthermore, it must be remembered that the process is a comparatively long one and that many foodstuffs are perishable and therefore it is advisable to have as much of the contaminated material subjected to aeration as quickly as possible after contamination. Actually the most efficient removal of "gas" by vaporisation would be accomplished in a closed chamber in which the atmosphere could be subjected to continuous suction from the top and the contaminated food material could be mechanically churned at the bottom. If the temperature of the chamber were raised the efficiency would be further increased and the time taken to decontaminate the foodstuff could be reduced to a very few hours. Under certain circumstances this reduction in time might well compensate for the extra cost, but usually the Gas Contamination Officer will have to make do with a building which affords the maximum natural ventilation, sometimes assisted by fans. Owing to the length of time food is kept in this section protection from the weather must be afforded and a roof and walls are desirable. The building should be so constructed that there are good air currents of both the through and the cross type. The walls should have at least a six-inch space between the floor and the bottom of the walls and another similar space between the roof and top of the walls to allow free passage of air: an opening at the highest point of the roof will facilitate the exit of contaminated air. If desired the rapidity of the decontamination by aeration may be increased by the use of fans or other mechanised device, but these will increase costs. The floor should be constructed of material such as concrete which can be readily decontaminated. The space between floor and walls can be wired to keep out rats. The food surface exposed in this section may be increased by the introduction of wire or other shelving but care must be taken not to overcrowd the building so that the efficiency of the aeration is reduced. If considerable shelving is introduced then artificial aids to air movement such as fans are desirable. Metal troughs can be used for the suitable spreading of contaminated foodstuffs, especially those of fine texture such as powders, but where possible, as, for example, with apples, potatoes, etc., food should be suspended on wire shelves so that the air circulates round all sides. The exit from this building should be at the opposite end to the entrance.

The section of the centre allotted to the temporary

storage of decontaminated foodstuffs should be adequate but not too large as the salvaged foodstuff should be put back into distribution channels or returned to the owner, if he is known, as quickly as possible. One part of this section should be kept solely for foodstuffs awaiting the report of the analyst before their release. An office for the keeping of proper records can also be included in this section.

Unfortunately it will rarely be possible for gas contamination officers to secure a decontamination centre comparable to that described above for they have been requested to spend as little as possible in developing their service and to utilise buildings and sites which are already available, especially if these are owned by the local authority. Nevertheless, with careful consideration and the application of perseverance and common sense much can be done to increase the efficiency of these centres and to make them simulate the ideal.

General Considerations governing the Action of the Gas Contamination Officer in Relation to Food

There are four main considerations which mus always be borne in mind by the Gas Contamination Officer when he is endeavouring to decide what action he should take with respect to a particular consignment of contaminated foodstuff. Actually, all the four considerations are interdependent, but for the sake of clarity they are dealt with separately.

(1) The general food situation of the country and of the particular locality appertaining at the time must always be considered by the Gas Contamination Officer. The necessity to seize contaminated foodstuff and subject it to decontamination processes will obviously be much greater the more grave the general food situation, but if plentiful supplies of wholesome food are available it may often prove unnecessary to attempt salvage. Occasionally a particular district may become temporarily isolated when maximum salvage of damaged foods will become extremely important.

(2) The bulk of contaminated foodstuff will influence the decision to act, in as much as small amounts will rarely repay salvage; on the other hand, large quantities may warrant decontamination measures even when food supplies are plentiful.

(3) The facilities available for dealing with the contaminated material must be borne in mind. If the decontamination centre should be destroyed by enemy action the possibility of improvising other centres within the locality or of transporting contaminated food to centres in other localities where they can be handled must be considered. Thought must also be given to the period of time which would be required to effect the salvage of the amount of contaminated material with the facilities available and whether this period is sufficiently short to enable decontamination of all the foodstuff to be practicable. The prevailing frequency of "gas" attack may affect this decision.

(4) Finally, careful consideration should be given to the probable cost of the decontamination processes required and the value of the foodstuff thereby salvaged. The decision arrived at will depend upon the severity of the contamination, the nature of the "gas," the putrescibility and other important characteristics of the foodstuff and the cost of the transport and handling required.

Action During an Emergency

As soon as practicable after the receipt of information concerning the contamination of foodstores the Gas Contamination Officer should make a survey of the affected foodstuffs and those suspected of being contaminated. He should consult, if possible, the Gas Identification Officer, upon the nature and extent of the contamination and should seek to arrest any extension of the damage. An endeavour should be made during this survey to decide whether the individual collections of affected foodstuff will justify decontamination and, if so, the urgency for this process. In the case of contaminated food animals the assistance of the veterinary services should immediately be sought. Where foodstuffs are packed in wood, cardboard, textile or paper casings or wrappings and these are splashed with "gas," they should immediately be transferred to the decontamination centre or an open space, and the casings or wrappings removed to stop the further spread of the "gas" into the food materials. It must not be assumed in this preliminary survey that stores of tinned foods, etc., need not be inspected, as not infrequently a proportion of the tins will be damaged, particularly if high explosive has been used.

Before contaminated foodstuffs are seized and removed an inventory of the supplies involved, as complete as circumstances permit, should be made. The Gas Contamination Officer should supervise the actual removal of the affected foodstuff and see that it is subsequently adequately protected from further damage arising from the weather or other causes.

The decontamination treatment should also be properly supervised, particularly where putrescible foodstuffs and impermeable food containers are concerned, so that further loss arising from secondary causes can be reduced to a minimum. In the case of putrescible foodstuffs it is essential to minimise any delay in their handling and in the case of impermeable food containers it is advisable to ensure so far as possible the recognition at the end of the treatment of the food contained in individual containers. The best method of ensuring this is to mark tins with a recognised code number before an emergency arises, as labels may often be blown off by blast or washed off during decontamination. Where large numbers of unmarked tins are affected these should, as far as is practicable, be divided into groups of the same food materials before decontamination is begun, each batch being properly recorded to ensure its recognition at the end of the process. Where tins containing different materials are of different shapes their separation into groups is not essential, if one labelled container of each shape is carefully decontaminated and put aside for purposes of recognition later.

After decontamination and consultation with the analyst when necessary, the Gas Contamination Officer must decide whether a salvaged foodstuff can (*a*) be released as it is for human consumption, (*b*) be released for use as a human food only after it has been cooked, blended or made up in other form; or whether if unsuitable for human consumption, (*c*) it can be released as an animal feeding stuff, or (*d*) can only be utilised for manufacturing processes such as the making of soap, fertilisers, etc.

Where foodstuffs are unsuitable for decontamination and have to be destroyed, this process should be carried out under the direct supervision of the Gas Contamination Officer and should only be effected

in the case of large quantities or valuable consignments of foodstuff after the local representative of the Ministry of Food has given his assurance that he is satisfied with this decision.

Full records must be kept of the disposal of all contaminated foodstuffs either after decontamination or by destruction.

Decontamination of Buildings

It must not be forgotten that warehouses, food stores, etc., must themselves be decontaminated before contaminated food which has been successfully salvaged can be returned to the store. The decontamination of buildings should be carried out by the ordinary A.R.P. decontamination squads.

Decontamination of large stores, etc., can be accomplished when non-persistent gases have been used, by creating a natural draft by opening doors, windows, ventilators, etc., With persistent gases, however, owing to the penetration of mustard gas into pores and cracks evolution of the "gas" will continue for some days, and hence it is then advisable to augment the effect of natural drafts by thoroughly hosing down with water the ceilings, walls and floors, followed by thoroughly spraying, rinsing or whitewashing them with a solution of chloride of lime or soap, etc. After two or three hours the decontamination should be complete and the building should be washed again thoroughly with plenty of water and submitted to prolonged ventilation. It must be remembered that the waste water from affected buildings will contain "gas" and, therefore, it should be decontaminated by mixing with chloride of lime.

It is well to take steps to avoid the introduction of "gas" into a store which has remained uncontaminated although in a contaminated region, by making individuals entering the store walk through chloride of lime, spread at the rate of 1 lb. per square yard.

The Detection and Identification of War Gases

It will be valuable to conclude this survey of "war gases" and foodstuffs with a brief review of the general principles underlying the detection and identification of these "gases" by the chemist. In this way a more ready appreciation of the difficulties of the analyst's task will be obtained.

Wherever possible the detection of "gases" should be made by the Gas Identification Officer (G.I.O.), a civil defence officer, who is a properly trained chemist with specialised experience in "war gases." It is an advantage where foods are concerned if the G.I.O. has some personal knowledge of food technology.

The "gases" may be detected by subjective or objective methods, that is to say by their effect upon the senses of the human observer or by appropriate chemical or physical tests made directly upon the "gas" itself. Subjective methods are the ones usually adopted in the "field."

(1) Subjective Methods.—(*a*) The most important of these methods is detection by *sense of smell*. Most poison gases have distinctive smells which, whilst being readily perceptible, are relatively harmless in low concentrations. Thus the smell of mustard gas can be detected in concentrations as low as 1 in 20,000,000 and the geranium odour of crude lewisite is perceptible in even greater dilutions.

Untrained observers must, however, remember that the sense of smell varies considerably with individual idiosyncrasy and with previous training, that it may be affected by catarrhal or other infections of the respiratory tract and that it is a sense which tires readily. The following points should be remembered when trying to identify a substance by sense of smell :—

(1) A slight sniff is all that is necessary; deep inhalation should be avoided.

(2) Repeated smelling dulls the perception and, therefore, the observer should inhale only once.

(3) After smelling, the observer should pause for reflection so that he may recall the smell.

(4) After smelling and reflection, the observer should exhale strongly through the nose several times to remove all traces of the substance as far as possible. A new smell test should not be undertaken until the effects of the previous one have disappeared.

(5) Smoking or the eating of sweets must be avoided whilst smelling.

It is interesting to know that traces of phosgene affect the taste nerves so that tobacco smoke acquires a flat metallic taste (tobacco reaction).

(*b*) *Sense of Vision.*—This sense is particularly important in cases of persistent gases and occasionally with non-persistent gases; as, for example, with a concentrated cloud of chlorine, which has a yellow green colour when dry or a whitish appearance if much moisture is present. Phosgene or di-phosgene give whitish clouds under similar damp conditions but are colourless and invisible when dry. Arsenical smokes are white and opaque if sufficiently concentrated but invisible when dilute. Although all unusual gases may not be poisonous it is as well to be suspicious of them at first in wartime. Occasionally visual effects are evidenced by the presence of rotted clothing, bleached vegetation, corroded metals and the appearance of the edge of a crater. Contamination by crude mustard gas gives rise to black stains on objects with a dry porous surface, *e.g.*, brickwork, as the liquid is rapidly absorbed leaving a dark oily stain. A similar effect is produced by the persistent lachrymators which are dark-coloured oils.

(*c*) *Physiological Effects.*—The effects of gases upon living organisms are useful in assisting detection, as, for example, with the lachrymators, which are immediately irritant to the eyes. Mustard gas has only a delayed action upon the skin but lewisite is immediately irritant.

This delayed skin reaction is made use of by the Gas Contamination Officer to see whether a foodstuff which has been decontaminated and no longer obviously smells of mustard gas, is in fact free from this gas. A quantity of the treated material is held (by various techniques) against the forearm of an individual for a period of about ten minutes. If mustard gas is still present in the material a slight reddening of the skin at the place of contact develops by the next day and then the foodstuff must be considered unfit for release without further treatment.

(2) Objective Methods.—(*a*) *Physical methods* have been used but they are not particularly serviceable.

(*b*) The use of detector paint is helpful in the determination of areas contaminated with *liquid* blister gas. The detector is usually a suitable solid material painted with a special yellow-coloured paint, which turns red in contact with liquid gas. The reaction is not specific for blister gases as such substances as

KSK, BBC, acetone, nitro-benzene, and pyridine also affect the paint. Furthermore, the use of these detectors is further limited by the fact that the reaction is only given by liquid and not by vapour contamination.

(*b*) *Chemical Methods.*—These are the most reliable and can be used quantitatively or qualitatively. They must be carried out by a qualified chemist. The chemist usually adopts some method to separate off the "gas" from an adequate sample of the contaminated material, and then effects its concentration before subjecting it to further tests. The common method is to place the contaminated material in a glass vessel maintained at 50° C., pass air through it and draw the vapours through activated charcoal, which adsorbs and thereby retains the poison gas. This charcoal-gas-concentrate can then be used as testing material, the "gas" being removed from the charcoal for further tests either by reheating or by extraction with a suitable solvent.

Subsequent identification is facilitated by grouping the gases according to the elements they contain. The more likely "war gases" may be separated for purposes of analysis into five groups according to whether they contain a halogen, sulphur, nitrogen and/or arsenic.

The groups are those containing :—

(*a*) A halogen only.
(*b*) Sulphur only, or sulphur and halogen.
(*c*) Nitrogen only, or nitrogen and halogen.
(*d*) Arsenic only, or arsenic and halogen.
(*e*) Arsenic, halogen and nitrogen.

Acknowledgments.—In conclusion, the author wishes to acknowledge his indebtedness to certain publications of the Ministry of Food, to various other papers made available to him; and in particular to the valuable assistance and advice on various points extended to him by Colonel R. M. Bamford, O.B.E., M.R.C.V.S., of the Royal Army Veterinary Corps, to whom he expresses his grateful thanks.

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(1) Food and its protection against Poison Gas. (2nd edition). (1941). Published on behalf of the Ministry of Food by H. M. Stationery Office.
(2) Various M.F.G. forms issued by the Ministry of Food.

SILAGE FOR MILKING COWS

"The feeding of silage to dairy cows has been providing many suggestively helpful results," states *The Farming News* which continues: "At the Rowett Institute, Aberdeen, where silage added to a maintenance ration of turnips, straw and hay has been fed to a herd of 80 milking cows at the rate of 20 lb. per gallon up to three gallons, it was found that yields were well maintained and the colour of the milk better than that obtained when the production ration consisted of concentrates. It had been demonstrated on small groups of cows that a yield of up to five gallons a day could be attained on grass silage alone. In other feeding experiments at the Rowett Institute it was also found that potatoes can replace 35 per cent. of concentrates in the ration of laying fowls without a reduction in egg yield. The potatoes, it is explained, must be boiled, and it was also found that potatoes are most palatable if made into silage after boiling and stored for at least two or three weeks."

THE VETERINARY RECORD

November 22nd, 1941.

"GAS"-CONTAMINATED FOODSTUFFS

In our current and previous issues we have published an account of the effect of "war gases" upon foodstuffs and of the means which can be adopted to prevent this damage occurring and the methods suitable for removal of the poison once it has occurred.

These lectures should be of general interest to the members of the profession but of particular interest to those Veterinary Officers who have been charged with the duties of "Gas Contamination Officer" by their own local authority.

If we assume that "war gases" will be used in the present conflict we are forced to the conclusion that considerable damage to foodstuffs is likely to occur from this cause in this country. As the possibility of danger exists, therefore, it is in the Nation's interests that steps be taken beforehand to minimise it.

It is satisfactory to note that the protective measures which can be adopted are not in themselves unduly costly and that considerable information is available to assist us in the choice of protective materials. Furthermore, it is perhaps still more reassuring to learn that contaminated foodstuffs can as a general rule be salvaged as the methods of decontamination are simple to carry out and relatively cheap.

Perhaps the most important lesson to be learnt from the articles is that the person responsible for looking after "gas"-contaminated foodstuffs must always consider carefully the situation with which he is confronted at any particular moment. This consideration, if it is to be of value, must be based upon knowledge, although the decision arrived at will very frequently be influenced in very large measure by the application of common sense. We hope that the published articles will be of some service in assisting those responsible to arrive at the correct decision.

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PROFESSOR DALLING'S NEW APPOINTMENT

PROVIDED that he is to be given the largely increased powers and facilities which have long been needed, in order to solve the many problems and difficulties by which the veterinary profession in this country is beset, we feel that Professor Dalling's appointment as Director of the Veterinary Laboratories of the Ministry of Agriculture and Fisheries will be welcomed by every member of the profession. Should, however, the necessary powers and facilities be lacking to enable him to initiate and carry through the co-ordinated research

and extensive field experimentation and other far-reaching measures which are essential to the initiation and prosecution of a progressive policy along the broad lines so often advocated by Professor Dalling, we feel that his translation to the Ministry's staff may mean that the profession has lost the independent advice of one of its most trusted advisers, and that without compensating advantages.

We hope that the departure from precedent shown in making this appointment may be taken as an indication that Government circles realise the serious position into which disease control and the scientific regulation and development of animal industry in this country have fallen. If this is so, the Ministry can rely upon the full support of the profession.

CLINICAL COMMUNICATION

Peculiar Symptoms of Arsenical Poisoning in Buffaloes

RODERICK MACGREGOR, F.R.C.V.S.
G.V.S., Pahang West, Raub, F.M.S.

Recently the Senior Veterinary Inspector, Lipis District, investigated a report that a buffalo had died as a result of arsenical poisoning. The animal was one of a herd of ten which had trespassed on a neighbouring estate and eaten a quantity of rat poison, composed of 56 per cent. sodium arsenite, bran and a blue dye (probably methylene blue). There was no other history for this animal, but *post-mortem* examination revealed congestion of the oesophagus, abomasum and small intestine, endocardial haemorrhage and extensive subcutaneous harmorrhage. The blood was thick and dark in colour, but smears were negative. The same night a second buffalo died and another was ill and vomiting. Haemorrhagic dermatitis was shown by these two animals. The sick animal recovered.

Some of the stomach contents and portions of the kidney and liver of the first dead buffalo were submitted for analysis, and arsenic was detected in all, though the amount taken was evidently small, probably not more than 3 drachms. As arsenic, in the form of arsenious oxide, can be given to cattle in half-ounce doses without causing death, it seemed possible that in this case it was not the cause of death; while the symptoms, especially the acute dermatitis, rather pointed elsewhere.

Sodium arsenite is, however, considerably more soluble and therefore more toxic than most other arsenical compounds, and its effects on buffaloes do not seem to have been recorded. As its use for rat and weed killing is increasing the police wished a fuller investigation of its properties to be made. The following experiment was therefore carried out.

Buffalo A.—Weight about 500 lb., albino; given *per os* 90 grains of the rat poison used on the estate in question. Symptoms: tenesmus, salivation, cessation of feeding and rumination, and *extensive haemorrhagic dermatitis* in five hours. This animal recovered.

Buffalo B.—Weight about 1,200 lb., albino; given *per os* 180 grains of same poison. Symptoms: profuse salivation, diarrhoea, stoppage of feeding and rumination, *extensive haemorrhagic dermatitis* and blue coloration of the skin (possibly due to the blue dye in the poison) all in five hours. This animal also recovered.

Buffalo C.—Weight about 500 lb., black; given *per os* 90 grains of commercial sodium arsenite. Symptoms: profuse salivation, cessation of rumination, *extensive haemorrhagic dermatitis*, coma and death in 40 hours.

Buffalo D.—Weight about 1,200 lb., black; given *per os* 180 grains of commercial sodium arsenite. Symptoms: the same as with C, but coma and death occurred in 50 hours.

Haemorrhagic dermatitis is not unknown in the human subject as a sequel to a single large dose of arsenic but its occurrence in other animals does not seem to have been noted hitherto. It seems evident, however, that it is a fairly constant symptom of arsenical poisoning in the buffalo; even when there is no external application of the drug.

The minimum lethal dose of sodium arsenite for buffalo would appear to be rather less than 60 grains for 400 lb. body weight.

ABSTRACTS

[LANCEFIELD GROUP B STREPTOCOCCI (*STR. AGALACTIAE*) ON THE HANDS OF MILKERS AND OTHERS. Harrison, J. (1941.) *J. Dairy Res.* **12**. 18-23. (9 refs.).]

Price (1938) has formulated the view that the skin flora is of two types, "resident" and "transient." The resident flora is a permanent population and difficult to eradicate, the transient flora may be acquired by contact with infective material. Harrison has investigated the possibility that milkers constantly milking cows infected with *Str. agalactiae* may acquire this organism as part of the resident flora of their hands.

Group B streptococci were recovered from the hands of eight milkers in three different herds. None of these herds was heavily infected, but all milkers gave positive cultures at one sampling or another.

Six persons not habitually in contact with cows gave negative results.

It is suggested that proper scrubbing with soap and water should precede the rinsing of the hands in a disinfectant. It appears that the mechanical action of scrubbing can materially reduce the skin flora, and a detergent, such as soap, also renders the contact of the disinfectant more effective.

D. L. H.

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[THE EXPLOITATION OF STRAW FOR FOOD. Williamson, G. (1941.) *J. Roy. Army Vet. Corps.* **12**. 137-144. (2 tables, 6 refs.).]

An historical account of the methods used for treating straw so as to render it more digestible is given. To-day Bechmann's process, using a weak solution of caustic soda without the employment of heat, is being experimentally operated on farms in Great Britain. A brief description of the plants used and the techniques employed is given. The results of feeding trials show that for ruminants the food value of straw on treatment is increased about 100 per cent. The total cost at present prices in Britain is in the region of £3 per ton, and the writer considers that the

process would only be used as an emergency measure or perhaps in areas where, even in normal times, cereal straw or "grass straw" is largely used as fodder. Straw, treated or untreated, is very deficient in protein and oil.

A. B.

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[THE CATTLE LICE OF GREAT BRITAIN. PART I.—BIOLOGY, WITH SPECIAL REFERENCE TO *HAEMATOPINUS EURYSTERNUS*; PART II.—LICE POPULATION. Craufurd-Benson, H. J. (1941.) *Parasitology.* **33**. 331-342; 343-358.]

In these two papers, Craufurd-Benson records his investigations into the biology, the seasonal variations and the distribution on the host at different times of the year of the cattle lice of Britain. His observations have been supplemented by answers from over 300 farmers who replied to a questionnaire sent to them. In Great Britain (excluding Ireland) there are three species of sucking lice, *Haematopinus eurysternus*, *Linognathus vituli* and *Solenopotes capillatus*, and one biting louse, *Bovicola bovis*. Their geographical distribution is not uniform since cattle in east England and east Scotland are extremely lightly affected, while those in southern Argyll, the Pennine Chain area, Wales and Monmouthshire and the western and midland plains of England are more severely affected. There was insufficient evidence to indicate that climatic factors control the distribution, but the author believes it is affected, at least in the case of *H. eurysternus*, by the varying farm practice in different areas. *B. bovis* was found to be the commonest and most widely distributed species. The incubation periods for the eggs of the four species of lice are recorded and in the case of *H. eurysternus* the higher the minimum air temperature the shorter was the incubation period. The complete life-cycle of *H. eurysternus*, from egg to egg, varied from 20 to 41 days, with a computed average of 28 days, while the maximum longevity of this louse on cattle was: males 10 days, females 16 days. Further, the threshold of development of the eggs of this louse appears to be about 27·5° C. The seasonal variations of the populations of the four species of cattle lice in Britain are similar. Maximum population density is reached in February and March; in April and May there is a rapid decline until the populations reach their lowest level in June to August; then in September the lice start increasing in numbers till they once more reach their maximum density. The regional distribution of the lice on the host at different times of the year varies in accordance with the seasonal variations of the whole population. The author also discusses the various factors affecting the population variations and comments that (*a*) the interrelated factors of light density and the thickness of the coat of the host animal strongly influence the activities of lice at all times of the year; (*b*) animals in poor health, usually as a result of feeding on poor quality food, are more susceptible to lice infestations than animals in good health; (*c*) rainfall is important in countries of periodic rainfall as it improves the quality of the pastures; (*d*) the quality of the food affects the general health of animals and also influences the texture of the skin; and (*e*) the condition of the skin influences, in some unknown manner, the activities of lice.

J. N. O.

[GROWTH OF THE FOWL CORYZA BODIES IN TISSUE CULTURE AND IN BLOOD AGAR. Nelson, J. B. (1939.) *J. Exp. Med. Biol.* **69**. 199-210. (3 tables, 7 refs.).]

The presence of small, Gram-negative, coccobacilliform bodies in the nasal exudate of chickens suffering from subacute coryza has already been recorded. Tissue culture and further study of these bodies has recently been undertaken. It has been found that the bodies can be maintained for an unlimited number of generations in tissue culture. One strain was still pathogenic after over 200 subcultures. The nature of the bodies is undetermined. Although a superficial morphological resemblance is shown to elementary bodies and the rickettsiae, they are separable from the latter on physiological grounds. The correct classification is probably with the bacteria because of their extra-cellular method of growth, and the adoption of one strain to blood agar. They are closely related to the infective agent of mouse catarrh. In size they resemble the granular forms of the problematical agent of bovine pleuropneumonia for which the generic name *Borrelomyces* has been suggested. Up to the present, however, it has been impossible to demonstrate in fowl coryza bodies the complex morphology which characterises the organisms of the pleuropneumonia group.

D. D. O.

REVIEW

["THE SCIENTIFIC ATTITUDE." By C. H. Waddington. Pelican Books. Published by Penguin Books, Ltd., Middlesex. (Pp. 126. Price 6d.).]

The period between the two great wars was one of bitter disillusionment, when old ideals and old standards were discredited. Religion has lost its hold over the great mass of the people and, the author contends, the world needs a new creed and a new cultural force to oppose Nazism.

The leaders of modern thought—such men as Rutherford, Bohr, Einstein and Freud—have all been scientists, and the author believes that science, and only science, is able to provide mankind with a way of life which is, firstly, self-consistent and harmonious and, secondly, free for the exercise of that objective reason on which our material progress depends. To some, the prospect of a "scientific world" may appear cold and uninviting, but this is not so because the days of austere scientific isolation are coming to a close; the younger scientists, particularly, realise that, although it is not easy, scientific methods of thought and analysis, in fact the scientific attitude, must be applied to political problems. Social studies are already reaching up to new levels of scientific achievement but a great deal of propaganda is still necessary because it is notoriously difficult to think objectively and scientifically or, in other words, absolutely honestly about political matters.

The fatal anachronism by which a largely scientific world is governed by an unscientific ruling class, educated in an outworn philosophy, must be overcome, and we must demand that our statesmen and administrators shall have a general summary of scientific knowledge and, above all, faith in the scientific method.

Society of Women Veterinary Surgeons

At the recent informal meeting of women veterinary surgeons, when a representative gathering was obtained, it was decided to form a Society of Women Veterinary Surgeons, to be an affiliated Division of the N.V.M.A.

Officers of the newly-formed Society and four members of Council were elected, these to work as a Provisional Committee to consider the constitution of the Society.

Those elected were :—

President.—Miss J. O. Joshua (Finchley).

Hon. Secretary.—Miss M. A. W. Bentley (London).

Hon. Treasurer.—Miss W. M. Brancker (Sutton Coldfield).

Council.—Mrs. K. G. R. Kelly (Liverpool), Mrs. M. L. Harris (Worthing), Mrs. E. I. Thomson (Beckenham), and Miss R. Teverson (Woking).

The official inaugural meeting of the Society will be held at 1.30 p.m. on Saturday, December 6th, at 36, Gordon Square, London, W.C.1.

IN PARLIAMENT

Prevention of Speculation in Agricultural Land

In the House of Commons on November 11th, Mr. R. S. Hudson, Minister of Agriculture, made the following statement on steps that the Government considered should be taken to prevent speculation in agricultural land:—

"During the discussions on the Agriculture (Miscellaneous Provisions) Bill, the view was expressed in a number of quarters in the House that steps should be taken to prevent speculation in agricultural land. The Government have been considering this matter and I am now able, with your permission, Sir, to inform the House of the conclusions that they have reached.

"In the first place it is necessary to distinguish between purchase of land for investment and purchase for speculation. So far as the former is concerned, it is not considered that any action is necessary at the present time, especially as the Government have already announced that, in so far as land purchased may subsequently become subject to public acquisition or control, any compensation will not exceed sums based on the standard of values at March 31st, 1939, and that legislation to give effect to this decision will be introduced in due course.

"In the case of purchases for speculation, the operator aims at a quick turnover, resale with vacant possession and the exploitation of the sitting tenant who may be induced to pay a high price in order to avoid the loss of his farm.

"It appears to the Government, therefore, that the most effective deterrent to speculation in agricultural land is to restrict the power of the purchaser to give effective notice to quit to the sitting tenant. This will also avoid the disturbance of tenants who are playing their part in the increased home food production campaign by farming their land well; disturbance which is obviously prejudicial to the national effort. It is, therefore, proposed to make a Defence Regulation providing that where the whole or any part of an agricultural holding is subject to a contract of sale made since the outbreak of war or has been sold in pursuance of a contract of sale made since that date, any notice to quit that holding or any part thereof given to the tenant so as to expire at any time after the end of the year 1941, shall be null and void unless the Minister of Agriculture and Fisheries or the Secretary of State for Scotland, as the case may be, consents in writing thereto. As at least 12 months' notice must be given in the case of an agricultural holding (with the exception of a few short leases in Scotland, where only six months' notice is required), the Regulation will in general cover any case where there has been a contract of sale since the outbreak of war and a notice to quit has been given since December 31st, 1940."

Mr. Levy: Is the right hon. Gentleman contemplating any agreement which means the State acquisition or State control of land? Is that Socialism in our time by my right hon. Friend? (Labour cheers.)

Mr. Hudson: The statement has already been made on behalf of the Government that in the event of any land being acquired for public purposes after the war the basic values of 1939 would be paid.

Mr. Levy: That is not quite what my right hon. Friend said in his statement.

Mr. Craven-Ellis asked if account had been taken of the change in the value of money.

Mr. Hudson said that that matter would have to be discussed when the legislation was introduced.

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The following are among further questions and answers recorded:—

Poultry Blood Tests

Sir R. Gower asked the Minister of Agriculture how many laboratories for the blood testing of poultry have been established under the auspices of his Department; how many such laboratories already existed under independent ownership; and what steps have been taken to ensure that the latter do not suffer by unfair competition from the former?

Mr. Hudson: Poultry blood tests are carried out at the Ministry's Veterinary Laboratory, Weybridge, and also at a branch laboratory established in 1939 at Lasswade, near Edinburgh, for the purposes of the free laboratory services to approved breeders of poultry in Scotland under Section 24 of the Agriculture Act, 1937. So far as I am aware there are not more than five private laboratories which undertake blood tests of poultry. Apart from official tests for breeders eligible for free testing, a small amount of work for other poultry owners is carried out at the Weybridge laboratory on a fee-paying basis which involves no question of under-cutting private enterprise.

Colonel Carver asked the Minister of Agriculture whether he is aware that poultry food is only allowed to breeders of pedigree poultry or other special breeders, provided these breeders have the blood of their flocks tested by the laboratories of his department, or have their flocks examined clinically by the county poultry inspector; and whether arrangements can be made for this work to be undertaken equally by the independent laboratories which have been doing this type of work for many years?

Mr. Hudson: Accredited and other poultry flocks approved for the purposes of the arrangements for safeguarding sound pure-bred foundation breeding stocks from the reduction in the feeding-stuffs ration made in April last are required to be blood-tested at my Department's Veterinary Laboratory, Weybridge, or at the branch laboratory at Lasswade, near Edinburgh. I regret that this work, which is carried out for official purposes free of charge, cannot be allocated to other laboratories.

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Purchase Tax

Mr. Price asked the Financial Secretary to the Treasury whether it is intended that all biological products used for medical and veterinary purposes should be exempted from Purchase Tax; why such items as tuberculin, johnin and *B. coli* anti-serum used solely for veterinary purposes were not referred to in Statutory Rules and Orders No. 1390, 1941; and whether he can put this matter right at an early opportunity?

Captain Crookshank: The exemption was intentionally confined to certain medicines and drugs of a specially costly character which are considered essential for the treatment of disease and, in the case of veterinary preparations, for the treatment of serious diseases of livestock of economic importance. Diagnostic reagents are not regarded as taxable medicines and it was accordingly unnecessary to exempt substances such as those mentioned in the second part of the Question which are prepared for such use.

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Combatant Officers (Pensions)

Rear-Admiral Beamish asked the Secretary of State for War whether, now that the Royal Army Ordnance Corps has combatant status, there is any reason to continue to differentiate between the rates of pension for colonels of the Royal Army Ordnance Corps and those paid to combatant officers retiring; and whether the similar difference which exists between combatant officers' pensions and those paid to Royal Army Medical Corps, Royal Army Pay Corps and the Royal Army Veterinary Corps officers will be adjusted?

Captain Margesson: The recognition of the combatant status of the Royal Army Ordnance Corps affords no ground for alteration in their financial conditions of service. Nor is it proposed to alter the provisions regarding retired pay in the case of the arms referred to in the second part of the Question.

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Slaughterhouses

Brigadier-General Clifton Brown asked the Parliamentary Secretary to the Ministry of Food how many public slaughterhouses are now operating in England, Scotland and Wales, respectively; and whether they are operating satisfactorily, both financially and economically?

Major Lloyd George: The approximate number of slaughterhouses which are being employed by my Department is as follows: England 565, Scotland 140, Wales 74. In view of the need for economy in transport, consideration is being given at the present time to the incidence of the slaughtering load at a number of slaughterhouses at present in use. Subject to this, I am satisfied that the slaughterhouses employed by the Ministry are, generally speaking, operating satisfactorily both from an economic and financial point of view.

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Irish Store Cattle

Mr. Dobbie asked the Minister of Agriculture what steps the Government have taken to lift the embargo on Irish store cattle coming into this country; and whether he is aware that many markets in the country have been badly handicapped through the embargo?

Mr. Hudson: I am aware that the embargo which it has been necessary on disease grounds to maintain for some months past on the entry of Irish cattle into this country has inevitably created difficulties. I am glad to say, however, that in view of the improvement in the disease situation in Eire, imports of store cattle were resumed from October 27th, subject to certain safeguards against the possibility of introducing infection. In the interests of meat supply only the more forward animals are being admitted for the present and a substantial proportion of the available shipping space will be needed for bringing in fat cattle for immediate slaughter.

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Feeding-stuffs

Mr. Rostron Duckworth asked the Minister of Agriculture whether he will revise the rationing scheme for horses so as to ensure that every owner of a horse shall, like the owner of a motor-car, be entitled to a small basic ration for his animals?

Mr. Hudson: No, Sir; owners of horses in common with owners of other livestock are expected to grow the feeding-stuffs they need, and the small supplies of feeding-stuffs available for horses under the rationing scheme must be confined to those performing useful work, where the owner has been unable to make adequate provision from his own resources.

Colonel Carver asked the Minister of Agriculture what type of horses described as farm horses in work will actually qualify for rations under the new scheme; and whether it is intended that light utility horses, used partly on farms and partly for driving, will qualify for rations?

Mr. Hudson: The county war agricultural executive committees are authorised to allow rations to any horses engaged in agricultural or other necessary work, including those referred to by my hon. and gallant Friend. Rations are allowed only on proof of, and on a scale commensurate with, needs.

ROYAL COLLEGE OF VETERINARY SURGEONS

Animal Management Examination, November, 1941

List of Successful Candidates

Edinburgh:

Arnot, C. A. M.
Baillie, J. R.
Banks, P. N.
Beynon, R. S.
Bridge, P. S.
Brown, D. A.
Clarke, A. J.
Coupland, A. M. T.
Dougill, Jack
Dudgeon, Alexander
Duncan, George
Fairclough, R. R.
Fennell, Clement
Grant, D. L.
Gray, G. M.
Handy, D. E.
Hanscomb, Raymond
Harding, H. P.
Harkness, B. R.
McCartney, W. D. J. (credit)
McNair, M. P. B.
Preston, P. T.
Potter, Robert
Russell, A. G. M.
Sharman, G. A. M.
Steven, H. J.
Stephenson, F. D.
Stirling, John
Tosayanonda, Kris
Wood, James

Glasgow:

Aird, J. S. (credit)
Anderson, A. W.
Brown, John
Burns, John
Gregg, J. R.
Hyam, R. I. C.
McIntee, D. P.
McKenzie, Alex.
Maguire, R. D.
Marshall, T. B. (credit)
Raeside, H.
Watters, Charles
Wilson, Andrew (credit)

Dublin:

Bryson, Hugh
Casey, P. M.
Clyde, D. H.
Corcoran, C. J.
Cronin, M. T. I. (credit)
Farrelly, B. T.
Gavagan, P. B.
Gleeson, Eugene (credit)
Hamilton, A. H. A.
Harbison, J. T.
Hatton, R. D.
Hill, H. J.
Jordan, H. (credit)
Kelly, D. L.
Kelly, W. H. B.
McCrea, G. H.
McFerran, A. M.
McKnight, R. W.
Marshall, J. V.
Moore, G.
Murphy, M. A. (credit)
O'Donnell, B. L.
O'Shaughnessy, T. N.
Owens, C. P.
Sherriff, R. B.
Simpson, T. T.
Tobin, W.
Young, J. A.

(To be continued)

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Weekly Wisdom

There is not so contemptible a Plant or Animal that does not confound the most enlarged understanding.—John Locke, 1690.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Nov. 28th.—Meeting of South Wales Division, N.V.M.A., at Carmarthen, 2 p.m.

Dec. 6th.—First General Meeting of the Society of Women Veterinary Surgeons, at 36, Gordon Square, W.C.1, 1.30 p.m.

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Refresher Tuition in Bovine Pregnancy Diagnosis and Treatment for Infertility

This refresher tuition is now beginning in certain areas—and has in fact already begun in South Wales. The experienced practitioners so far chosen from among those who offered their services, and the areas allocated to them, are as follows:—

G. N. Gould, M.R.C.V.S., of Southampton: for Leicestershire, Staffordshire and Warwickshire.

S. Jennings, M.R.C.V.S., of Knowle, nr. Birmingham: for Lincolnshire and Nottinghamshire.

J. McWilliam, M.R.C.V.S., of Nantwich: for Cumberland, Durham, Northumberland and Westmorland.

L. P. Pugh, B.SC., F.R.C.V.S., of Sevenoaks: for Kent and Sussex.

H. W. Steele-Bodger, M.R.C.V.S., of Tamworth: for South Wales.

These experts will be visiting their respective areas in the near future and practitioners who have intimated their wish to receive tuition will be hearing from them concerning dates, etc., shortly.

The many members in all the other counties in England, Scotland and Wales not yet catered for, who have sent in their names as being desirous of having refresher tuition, will in due course hear from the "specialist" to whom their particular area has been allotted, as and when this is organised.

Members resident in the above areas who desire to have this tuition and who have not yet sent in their names, should do so at once to the General Secretary, N.V.M.A., 10, Bore Street, Lichfield, and the necessary arrangements will be made. Those resident in areas not yet catered for can still, of course, also send their names to the General Secretary.

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A.R.P. (Animals) Service

We would remind those of our readers who are concerned that, as announced in a recent issue of this journal, arrangements have now been made with the Ministry of Home Security for the issue of Certificates of Occupation to members of the profession who are assisting the A.R.P. (Animals) Service, in order to facilitate their passage in controlled areas.

The form is a certificate of occupation issued under the authority of the Ministry of Home Security through the N.V.M.A. Members of the profession who desire such a certificate should make a request—giving their National Registration Identity Number and intimating whether they are engaged in general practice on their own account or, if employed by others, in what capacity—and forward it to 36, Gordon Square, W.C.1, marking the envelope "A.R.P."

DAIRY HERD WASTAGE: "MAKE THE FULLEST USE OF VETERINARY SCIENCE"

In the leading article in its issue of Monday last, reproduced below, *The Times,* by implication, emphasises the value of the Association's campaign for maintaining the country's milk supply through the control of the major diseases of dairy cattle.

"Ordinary consumers are now feeling the limitation set to the quantity of fresh milk they can buy, total sales by retailers having been cut by 15 per cent. in the past three weeks. The purpose of this cut in ordinary milk sales is to ensure full supplies to meet the requirements of children, expectant mothers, invalids and the hospitals. Everyone recognises the wisdom of giving such priority, but people are asking why there is not enough fresh milk to satisfy all demands. Before the war supplies of fresh milk were ample even in mid-winter. But now the demands for fresh milk have greatly increased and the supply has not kept pace. Milk is being given free or at a reduced price to many thousands of people who especially need it. This has created a big new outlet and at the same time the general public, who now manage with less meat and fewer eggs, have been buying more milk. At the same time the supply is being no more than maintained at the old level. So in mid-winter, when milk yields are at their lowest, the adult consumer has rightly been required to forego a small part of his normal supply. More dried milk and more cheese have been released as compensation, and most consumers should suffer no great hardship.

"Can steps be taken to increase the output of fresh milk in the winters of 1941-42 and 1942-43? Milk production was increasing in the years before the war, largely because the farmer could count on dairying to give him a regular income when most other kinds of farming were depressed or at the best uncertain. Milk production is an exacting business for master and man—cows have to be milked twice a day for seven days a week—and now that grain-growing and arable farming generally are giving satisfactory returns there is a tendency to switch back to mixed farming at the expense of dairying. This has not gone far yet. Some of the larger farmers have reduced their herds, and the cows have been bought by others who retail milk in the country towns and villages where the population is swollen by refugees. This distribution of cows does not affect the total milk supply, but plans can be laid now to increase the country's dairy herd. Additional cows ready-made for the dairy cannot be produced at will, but wastage in the present herds could be greatly reduced by making the fullest use of veterinary science to check several diseases, such as mastitis, which must cost many thousands of gallons of milk each year. At the same time every encouragement can be given to farmers to rear more heifer calves which will be ready to take their places in the dairy in two and three years' time. The country cannot afford a break in livestock breeding policy."

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ROYAL ARMY VETERINARY CORPS

Recent issues of *The London Gazette* publish the following information relative to R.A.V.C. personnel:—

Capt. W. W. Henderson, C.B.E. (60906), having attained the age limit of liability to recall, ceases to belong to the Reserve of Officers, November 5th, 1941.

Lt.-Col. H. Stephenson, M.C. (4755), having attained the age for retirement, retires on retired pay November 10th, 1941.

Maj. S. O'Donel, M.C. (24865), to be Lt.-Col., November 10th, 1941.

R.C.V.S. OBITUARY

Fletcher, Tom Cooper, 3, Ellin Street and (recently) 135, Norton Lane, Sheffield. Graduated London, April 1st, 1881. Died November 11th, 1941; aged 82 years.

Mr. Tom C. Fletcher, M.R.C.V.S.

We record above, with much regret, the passing of Mr. T. C. Fletcher, the oldest practitioner in Sheffield, and a highly esteemed member of a well-known family of veterinarians. Both his father, Thomas Fletcher, and his brother, Walter J. Fletcher, were in practice and after graduation he joined the former in his practice in Ellin Street, where he remained until "enemy action" forced him to another residence, 135, Norton Lane. Although he was failing, he drove his own car as recently as last Saturday week, and his end was a most peaceful one, in his sleep.

Mr. T. C. Fletcher always took a keen interest in cattle and was a practical enthusiast for clean milk production: for 49 years he was Hon. Secretary of the Sheffield and District Cowkeepers' and Dairymen's Association.

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IMPORTATION OF LIVESTOCK FROM IRELAND

A recent announcement by the Ministry of Agriculture reads as follows: "Owing to the cessation of outbreaks of foot-and-mouth disease in Ireland, the prohibition previously in force on the importation into Great Britain of cattle, sheep, pigs and goats from that country was relaxed from October 20th, 1941, subject to certain safeguards. The Minister of Agriculture is now satisfied that there is no longer any necessity for maintaining these safeguards and accordingly he has made an Order withdrawing them as from November 24th. The effect of the Order will be to allow the trade to be carried on under conditions similar to those which existed before the outbreaks of foot-and-mouth disease occurred in Ireland. It will thus be possible for animals not intended for immediate slaughter to be moved from the landing places at which they are landed, either to markets, and thence to private premises for detention for six days, or direct to private premises for such detention. Animals intended for immediate slaughter may be moved direct to slaughterhouses as at present in accordance with arrangements made by the Ministry of Food.

"The restrictions imposed by the Imported Cattle (Restriction on Use) Order on the entry, except for immediate slaughter, of all cattle which have not, in addition to two permanent incisor teeth fully up, one of the second pair of incisor teeth showing will remain in force. The Agricultural Ministers have, however, decided to allow from November 24th the importation under licence into Great Britain of a limited number of cows and heifers obviously in calf and cows in milk. The distribution of licences for the shipment of dairy animals from Eire to ports in Great Britain is being undertaken by the Department of Agriculture for Eire, Dublin. Licences to import dairy cattle into Northern Ireland are already being issued and applications should be addressed to the Ministry of Agriculture for Northern Ireland, Stormont, Belfast."

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LEGAL NOTES

Quality of Milk Reduced by Lack of Dairy Cake.—The High Court recently heard—and dismissed—an appeal (by case stated from a decision of the Hove Justices) in which were mainly concerned the circumstances in which milk can be assumed to be legally "as from the cow." In its report of the case *The Farmers' Weekly* points out that under the Sale of Milk Regulations, 1939, milk containing less than 8·5 per cent. of solids not fat is presumed not to be genuine "until the contrary is proved," and continues: "In the case before the court a sanitary inspector contended that the only way to prove 'the contrary' was to show that no one could have had access to the milk.

"The Court (presided over by the Lord Chief Justice) disagreed and found in favour of the farmer concerned.

"The case arose out of a summons heard at Hove wherein William James Reeves, jun., High House Farm, South Common, Chailey, Sussex, was charged on an information laid by the senior sanitary inspector of Hove with having sold milk deficient in milk solids not fat, contrary to Section 3 of the Foods and Drugs Act, 1938.

"The evidence in the lower court was that Mr. Reeves delivered 36½ gallons of milk in four churns. Samples taken showed a falling short of the solids. The milk was the bulked product of the afternoon milking of January 15th and of the morning of January 16th of 14 cows. The tank was not constantly under observation. Two churns containing the afternoon's milk were left in the dairy for some 13 hours from about 5 p.m. to 6 a.m. on the next morning when milking began. Lids were half placed on the churns to allow the entry of air and no one was looking after them overnight. The January 16th milking was carried out in the same way, whereupon the churns containing the milk of that and the previous milking were labelled and sent by lorry to the purchaser's premises. Neither Mr. Reeves nor his employee added any water to the milk. At the material time Mr. Reeves was allowed to buy only 66 per cent. of the quantity of dairy cake he bought in the year before the war, although he had more cows in milk at the later period.

"Mr. Reeves contended that the milk was sold in exactly the condition it was when it was drawn from the cows, and that the deficiency in milk solids other than fat could be accounted for on natural grounds.

"For the inspector it was argued that the milk being deficient in milk solids, the burden was on Mr. Reeves to prove the defence which he had raised.

"The justices were of the opinion that the milk was sold in the same condition as when drawn from the cows and dismissed the information. The inspector now appealed.

The Judgment

"Giving judgment dismissing the appeal, the Lord Chief Justice said there had been a considerable period overnight between January 15th and 16th when the milk had not been constantly under observation, but evidence had been accepted by the justices of a deficiency in the quantity of the feeding-stuffs available. By Article 2 of the Sale of Milk Regulations, 1939, milk containing less than 8·5 per cent. of solids other than fat was to be presumed not to be genuine 'until the contrary is proved.'

"'It is urged for the inspector,' the Lord Chief Justice went on, 'that the only way in which "the contrary" could be proved was by showing impossibility of access to the milk by evilly minded persons. There is, however, no authority for that proposition, which lays down an unnecessarily high standard of proof. There is no reason why, apart from any evidence at all of non-access to the milk, justices, having evidence about a deficiency in feeding-stuffs, should not conclude that the milk was genuine.'"

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For failing to notify the police of suspected tuberculosis in a heifer and for causing unnecessary suffering to a heifer, Thomas Studley, a Cheshire farmer, was fined £50 at Broxton and ordered to pay £1 11s. 6d. special costs. It was stated that he had 32 previous convictions under the Diseases of Animals Act.

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TOXIC MANIFESTATIONS OF THE SULPHONAMIDES

In a review of the above subject published in its issue of November 23rd, 1940, *The British Medical Journal* observes: "Ever since Ehrlich first produced arsphenamine it has been the chemotherapist's dream to discover remedies which would leave unharmed the tissues of the body while destroying entirely the parasites that infest them. Unfortunately, just as no rose is without its thorn,

so up to the present no chemotherapeutic remedy is without its toxic manifestation. Nevertheless it is easy to exaggerate the frequency and importance of such side reactions, to use an American term, because for every patient whose case is duly recorded as an example of toxic features caused by chemotherapeutic agents there are many hundreds who pass unnoticed, because their treatment is unattended with any untoward results. This tendency to stress the importance of toxic reactions has been especially noticeable in the case of the sulphonamide drugs, although the incidence of severe reactions due to these compounds has in fact been extraordinarily small. The two most spectacular and dangerous reactions caused by the sulphonamide drugs are undoubtedly acute haemolytic anaemia and agranulocytosis. Some slight degree of macrocytic or normocytic anaemia occurs in about 3 per cent. of persons subjected to prolonged sulphanilamide medication, due, according to Watson and Spink,[1] to a disturbance in haemoglobin formation as well as to some slight degree of haemolysis. Only some 70 cases of acute haemolytic anaemia, however, have been recorded, about two-thirds of them due to sulphanilamide and a considerable proportion in negroes. Beteween 70 and 80 cases of agranulocytosis caused by sulphonamide compounds have been fully recorded, and incidental mention has been made of between 40 and 50 others. Even if only one-tenth of the cases of agranulocytosis and acute haemolytic anaemia have been reported the incidence of these two toxic manifestations is infinitesimal when compared with the millions of people who in the past four years must have been subjected to treatment with the sulphonamides. In order to gain a more correct idea of the character and frequency of the poisonous effects of these drugs and their importance in the course of therapy, Long and his colleagues[2] have recently analysed the incidence and types of reaction in patients admitted to the Johns Hopkins Hospital during the past few years, 1,000 having been treated with sulphanilamide, 297 with sulphapyridine, and 291 with sulphathiazole. Kolmer[3] has also summarised the various toxic reactions due to these compounds. All three—sulphanilamide, sulphapyridine and sulphathiazole—and others less rarely used such as uleron, rodilone and albucid, show a certain similarity in the types of reaction they produce, but like the members of a human family each has its own individual peculiarities. Thus nausea and vomiting are uncommon with sulphathiazole, fairly common with sulphanilamide, and very frequent with sulphapyridine, at least in white adults, for, curiously enough, negroes and children rarely react in this way. Neuritis is very rare with sulphanilamide and has not been reported with sulphapyridine or sulphathiazole, but with uleron it is by no means uncommon. Skin rashes have been recorded with practically all the members of the family, but are most common with sulphathiazole, a nodular form being especially frequent. According to Long and his colleagues skin rashes, usually appearing from the fifth to ninth day, are present in 5 per cent. of persons treated with sulphathiazole, as compared with 1·9 per cent. and 2 per cent. of those treated with sulphanilamide and sulphapyridine respectively. Haematuria has been reported only once or twice with sulphanilamide, but with sulphapyridine it occurs in 8 per cent. and with sulphathiazole in 2·5 per cent. of cases. Injection of the sclera and conjunctiva seems to be peculiar to sulphathiazole. It might have been thought that all toxic reactions to the sulphonamide drugs had already been encountered. De and Kona,[4] however, have recently described two curious cases in which the administration of small doses —7·5 grammes of sulphanilamide and 30 c.cm. of a 2·5 per cent. solution of prontosil in one instance, and 1 gramme of prontosil in the other—was followed by intense cyanosis, a rapid fall in the percentage of haemoglobin and in the number of red blood corpuscles, haematuria, methaemoglobinuria, and death. It is curious that comparatively small differences in the molecular structure of these sulphonamide compounds should be so closely correlated with differences in pathological selectivity. One of the tasks of the future is to determine the reasons for this correlation."

(1) *Arch. intern. Med.* (1940.) **65**. 825.
(2) *J. Amer. med. Ass.* (1940.) **115**. 364.
(3) *Arch. intern. Med.* (1940.) **65**. 671.
(4) *Indian med. Gaz.* (1940.) **75**. 385.

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BEE DISEASES

A recent Ministry of Agriculture announcement relative to the above, reads: "Bee keepers are aware that a Defence Regulation was made on May 30th, 1941, giving the Minister of Agriculture power to take steps to prevent the spread of pests or diseases among bees, after consultation with an Advisory Committee. This Committee, the Bee Disease Advisory Committee, was set up and has already commenced its work. It includes nominated representatives of the various sections of the craft, and its full membership is as follows: Dr. A. L. Gregg (Chairman), Brother Adam, Dr. C. G. Butler, Mr. L. Illingworth, Mr. G. W. Judge, Mr. W. L. Lordan, Colonel Ponsonby, M.P., Rev. W. H. Richardson and Dr. F. Thompson.

"The Committee has approved the terms of a draft Order for the control of foul brood disease, and has made a number of recommendations to the Minister on the operation of the Order. The draft Order and recommendations follow the lines of the proposals put forward by the Rothamsted Bee Research Advisory Committee at its meeting on May 15th, 1940, and subsequently published in the Bee press. It is hoped that the Order will be in full operation next year; a further announcement will be made in due course.

"When the Order comes into operation, Bee Disease Insurance, Ltd., will continue to operate its insurance scheme as at present, and has, indeed, already announced its intention to extend the scope of the scheme, though at a somewhat higher premium, to any individual beekeeper not a member of an insured association who wishes to take advantage of it. The Order is intended to to enable action to be taken to deal with outbreaks of foul brood disease in the hives of those bee-keepers who do not co-operate to combat the disease and whose neglect is endangering neighbouring apiaries.

"To enable the Department to continue to deal with bee diseases and pests without interruption after the war, the provisions of the Defence Regulation were embodied in the Agriculture (Miscellaneous Provisions) Bill." [This Bill was recently accorded the Royal assent.]

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In the "Advertisers' Announcements" column of our issue of October 18th, reference was made to the introduction of a preparation for the treatment of tape-worm infestation of small animals "to replace a well-known preparation of foreign origin." To avoid possible misunderstanding of the position, we are asked by Messrs. Bayer Products, Ltd., to state that stocks of their preparation "Nemural" are still available.

* * * * *

A recent Government announcement reminds farmers of their obligation, under Part II of the War Damage Act, to insure their movable goods (live and dead stock, including growing crops). To obtain compensation under his policy, a farmer should notify the local Livestock Officer at once of his loss. The Livestock Officer will supply a claims form which should be completed and returned to him within 30 days of the damage. The Livestock Officer, whose address may be obtained from the local branch of the National Farmers' Union or from the County War Agricultural Executive Committee, will value the damage and report accordingly. In Scotland, farmers who have suffered war damage should consult their Agricultural Executive Committee as to the procedure to be followed.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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Victoria Veterinary Benevolent Fund

Christmas Gifts Fund

To the Editor of the Veterinary Record

Sir,—Christmas is coming and will be here in less than five weeks. We should like once again to be able to distribute to the old and feeble, and to the widows and orphans, some little gift to help to brighten their drab lives. Donations from members for this purpose will be very thankfully received. Among the many appeals which members receive at this time this one we feel sure will commend itself to their sympathy.

Donations should be addressed to Fred Bullock, Secretary of the Fund, *at 18, Victoria Avenue, Harrogate.* Remittances received by December 20th will be utilised for this year's gifts; cheques received after that date will be credited to next year's fund.

Yours faithfully,

J. W. Brittlebank, *President.*
A. Spicer, *Treasurer.*
P. J. Simpson, *Hon. Secretary.*

10, Red Lion Square,
London, W.C.1.
November 15th, 1941.

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CONTROL OF ANIMAL DISEASE: THE SCHEME OF THE SURVEY COMMITTEE OF THE N.V.M.A.

To the Editor of the Veterinary Record

Sir,—Resolutions passed at the divisional meetings indicate that the majority of the profession is in favour of the Survey Scheme, but despite this a considerable amount of adverse criticism has recently appeared in these columns. The inadequacy of the technical means now available for controlling disease has been the chief subject of criticism and it would appear that a number of people are seriously worried, and naturally so, about our ability to control the diseases dealt with in the scheme.

The advisability of introducing the Survey Scheme cannot, however, be judged entirely on the efficiency of technical methods; there are wider considerations. This country is fighting a total war in which food supplies are a vital factor. In order to increase the supply of food, particularly milk, it is urgently necessary that the losses from the major diseases of cattle should be reduced to a minimum. I think the question is: are we putting even the methods available to the best possible use, and could we by any change in methods reduce the loss of food due to animal disease?

In the last war the profession was given the task of maintaining army transport animals and cavalry in as high a state of efficiency as possible. Under the leadership of an experienced veterinary directorate this task was performed, and the profession received credit for so doing. No one, however, would suggest that the technical means of controlling respiratory diseases in horses were any more effective than those now available for controlling cattle diseases. In this war, an infinitely greater and more significant struggle, the profession has again been given a job to do—it is perhaps a less obviously urgent task but it is a far bigger one, namely, to maintain the efficiency of the food-producing animals at as high a level as possible and so make a permanent contribution to human welfare.

I believe that although two years of war have passed, and although many individuals have done much, we as a profession have not made the vigorous and organised effort that was made in the last war. We can either accept this situation and allow it to continue for the duration of the war or evolve some means of remedying it. What are the prospects of controlling disease under the present system?

It is an unfortunate but a well-recognised fact, that with the methods of fee-paying private practice one is usually called in much too late to deal effectively with the serious but insidious diseases of cattle, and it cannot be said that the present system has achieved any great success or that on the basis of "so much a visit" the farmer will ever seek advice before it is too late. In fact, although I was very pleased to read the letters of Messrs. Willis, Blaxland, Crosfield and Tutt, Professor McCunn has summarised the position for us. Apparently after many years in which the bulk of the profession has been engaged in private practice, we occupy, in relation to the agricultural scientist, the position of "the dog under the table," and yet he offers no suggestion to remedy this situation.

It is difficult to define, in general terms, methods of controlling contagious disease of livestock, but it would appear that there are at least three conditions which should be satisfied before success can be achieved.

(1) Reasonably effective technical methods.

(2) A well-trained veterinary profession which has its heart in the job.

(3) A farming community sufficiently well educated to understand the importance of controlling these chronic diseases and willing to co-operate.

It will be realised that the last two conditions are quite as important as the first. Will the Survey Scheme help to produce these conditions?

Although obviously it cannot immediately improve technical methods of control, it appears necessary to emphasise that it will not reduce their effectiveness, and, in fact, under the scheme the Ministry has offered specific technical services. Veterinary surgeons have already spent a great deal of time and energy trying to control mastitis, contagious abortion, sterility and Johne's disease, and whilst one naturally treats Mr. Motton's opinions with respect, it is difficult to understand how a slightly more vigorous and more effective attempt at control will be of disadvantage to the public and the prestige of the profession. The statement that the proposed live vaccine for controlling contagious abortion is "not only an unforged but an uninvented weapon" is quite untrue. A considerable amount of research has been devoted to this type of vaccine and the consensus of opinion is that, particularly in present circumstances, it is by far the best method we have of controlling the disease. It is now possible to maintain a culture at a standard level of virulence. The scheme has already had a stimulating effect on research. Taking a longer view, by rousing interest in disease control, or if the worst comes to the worst, demonstrating the necessity for more effective methods of control, the farming community will be led to demand more adequate research. This will cause a rapid increase in our knowledge of animal diseases and methods of controlling them—an end so rightly desired by some critics of the scheme.

(2) Even critics will admit that already the scheme has had an educational value in the profession; we have become more conscious of the need for disease control and of the methods available; money and facilities have been obtained for training in methods of sterility treatment. It is to be hoped that by directing attention to the important aspects of our work and to the necessity of adequate training in these subjects it will eventually produce a great improvement in the teaching of students.

(3) One criticism of the scheme has been that there is no demand for it from the farming community. The veterinary profession surely has the right, or even the duty, to lead farmers in matters of disease control, but to say that there is not a serious demand for a greater control of cattle diseases is obviously untrue. Although many practitioners have the confidence and respect of their clients this demand is not being adequately met by the present system of fee-paying private practice. The veterinary surgeon is usually looked upon as someone to call in when the trouble is immediate or urgent, but some farmers, and often the more progressive ones, seek advice on disease control from agricultural advisers. This is largely due to the present method of fee-paying practice and is a tendency which will increase unless alterations are made. The Survey Scheme would encourage farmers to seek advice from their veterinary surgeons concerning disease control. It would also lessen the tendency, as soon as an effective remedy is produced, for farmers to apply it themselves—a practice which is ultimately harmful to agriculture. The Report of the Survey Committee has already stimulated the demand of the farming community for the more effective control of disease.

The Survey Scheme surely does not put us under any legal obligation to eradicate disease at one stroke; in fact, in some ways it is very like the old system of contract practice which worked very well in London. It is merely a method by which we will endeavour to reduce the losses caused by disease in this country and so justify the reservation of the profession.

I believe, therefore, that the system proposed by the Survey Scheme for the control of disease will have many advantages over present methods. None of the critics so far has clearly shown that the scheme would be a less effective method of controlling cattle disease than is the present method of private practice. They have merely told us that it is very difficult to control chronic diseases of cattle—a difficulty which was no doubt fully realised by the Survey Committee. It is idle to contend that the time is unsuitable and we should wait until the war is over. Professional prestige and the future usefulness of the profession will depend on the public's estimate of our contribution to the winning of the war.

The medical profession has been largely reorganised to meet war-time needs and it is generally recognised that the Emergency Medical Service will evolve and take a permanent place in the medical services of the country; profound changes are already taking place in hospital organisation. The whole tendency of human evolution has been one of organisation into larger, more interdependent communities, with less freedom and more social responsibilities for the individual. The example of a boat-race crew shows that although all achievement is due to individual effort, success often depends largely on a highly co-ordinated and combined effort.

Although some people may refuse to admit it, we are living in a period of unprecedented philosophical, poljtical, social and scientific change, and it is hardly possible for the veterinary profession to resist the general evolutionary trend. It would appear, therefore, that unless the critics have any undisclosed constructive proposals we are faced with two alternatives. Either we go forward with the scheme which will, if everyone is sufficiently determined, preserve a large amount of individual initiative and the free choice by the farmer of his practitioner, or we continue the policy of *laissez faire*: a policy which, unless the profession is taken over entirely by the Ministry, will cause it to play a smaller and smaller part in British Agriculture.

Yours faithfully,

John Francis.

"Mead Cottage,"
Normandy,
Surrey.
November 9th, 1941.

A PRACTITIONER'S COMPLAINT

To the Editor of the Veterinary Record

Sir,—The correspondence which has followed my original letter seems to have encouraged us to think aloud.

The point seems to be generally accepted that there is very urgent need for the control of many animal diseases. To carry this out efficiently there must be a central controlling body, and that body should be representative of all branches of the profession, so as to be in a position completely to advise the Government on the necessary legislation, to advise representative bodies of agriculture on veterinary matters and to assist the practitioner to carry out the considered opinions of the central control. The central control should collaborate closely with the various pathological institutions and carry out research in their own laboratories, to enable the various diseases to be tackled in an efficient and modernly scientific manner.

Lady Daresbury's letter to the *Record* is a case in point. It is only natural that such a society as she represents should communicate with the Animal Health Division of the Ministry of Agriculture, who should be in a position to impart authoritative information on any subject relating to diseases of animals. The Council of the N.V.M.A. is a representative body, but of course has not the authority of, nor the desire to override, the Ministry of Agriculture. It seems to me to be quite obvious that the most satisfactory method by which to arrive at the necessary collaboration, in order to make the best use of the results of research, whether scientific or practical, is the institution of a State Veterinary Service, with the veterinary branch of the Ministry of Agriculture at its head, supported by the collaboration of all the scientific institutions in the country and guided by such a body as the Council of the N.V.M.A. At the present time all the institutions exist, but instead of working in collaboration with one another, each pursues its own jealous course, with constant bickerings, dissatisfactions and consequent inefficiency. I am sure that every member of the profession is willing and even anxious to do his best in the interests of the profession, the public at large and, last but not least, himself.

As a profession we have the ability to cope with all matters relative to our science, but it is a case of "too many cooks," and, "united we stand."

Faithfully yours,

W. Shipley.

Southtown,
Great Yarmouth.
November 10th, 1941.

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LONG-STEMMED CLINICAL THERMOMETERS

To the Editor of the Veterinary Record

Sir,—In order to follow up certain observations recently made by Messrs. John C. Grant, P. G. Millar and myself, I would like to acquire one or more long-stemmed (9-10 inches) thermometers suitable for recording the rectal and vaginal temperatures of dairy cows.

If any practitioner or instrument-maker could loan or otherwise let me have a thermometer, I should be grateful. I understand that "lotion" thermometers were at one time used in veterinary practice. It is unlikely that the actual observations will be made for some months to come, but standardisation takes rather a long time in present circumstances.

I am, Sir,
Your obedient servant,

A. N. Worden.

Institute of Animal Pathology,
Field Laboratories,
Milton Road,
Cambridge.
November 11th, 1941.